Space Weather Forecast

Issued on Sunday, 05 May 2024 at 01:14 Local

This forecast provides a four day assessment of space weather events. The probabilities stated below are for reaching or exceeding the given levels. For more information about space weather impacts please see the Met Office Space Weather Scales https://www.metoffice.gov.uk/weather/learn-about/space-weather/uk-scales

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Space Weather Forecast Headline: Further Moderate-class flares likely with a chance of Strong flares through the period. Minor-Moderate Geomagnetic storm conditions are likely on day 1 (5 May), with a chance of isolated Strong storm intervals. Lowering chance of further Minor storm activity days 2 to 3 (6 to 7 May).

Analysis of Space Weather Activity over past 24 hours

Solar Activity: Solar activity was at Moderate levels, due to an upper level Moderate flare at 04/0619 UTC and also at 04/2348 UTC from a large, complex active region in the northwest disc, which also produced several other lower Moderate flares. There are currently nine sunspot regions on the visible disc, seven of which are numbered. A further growing and complex region is located in the southeast of the disc, which produced occasional Common-class flares through the period. Otherwise, the remaining sunspots on the disc are generally smaller, stable or in slight decay, and magnetically simple.

A largely northward directed CME was observed following the M9 flare on the 4 May, analysis was undertaken on limited available imagery with modelling showing a possible glancing interaction late day 2/early day 3 (6 to 7 May). No other obvious Earth directed CMEs have been observed, however updated LASCO/SOHO coronagraph imagery is currently unavailable, and STEREO-A imagery is limited, therefore confidence is lower than normal.

Solar Wind / Geomagnetic Activity: Solar winds were at background levels, currently around 350-4000km/s. The Interplanetary Magnetic Field was weak. The important north-south component was also weak. Resultant Geomagnetic activity was predominantly Quiet, with an isolated Unsettled interval prior to midnight UTC (Kp 1-3).

Energetic Particles / Solar Radiation: Solar radiation was at normal background levels.

Four-Day Space Weather Forecast Summary

Solar Activity: Moderate to High solar activity is forecast to continue with further Moderate-flares expected and a chance of isolated Strong flares, principally from the large sunspot regions located in the northwest and southeast disc.

Solar Wind / Geomagnetic Activity: Three Earth-directed CMEs currently feature in the forecast period. The first may arrive early day 1 (05 May), the second in the middle or second half of the day 1 (05 May), with the third possibly glancing late day 2/early day 3 (6 to 7 May. Initial normal background solar winds may increase solar wind speeds on day 1 (05 May) due to the influence of a coronal hole. A second coronal hole is expected to become geo-effective later on day 2 (06 May) and could see speeds peak at elevated levels between days 2 and 3 (06 and 07 May) before slowly declining.

Combining possible effects from the various CMEs and coronal hole influences through the

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period results in a lower than average Geomagnetic forecast confidence.

Geomagnetic activity although initially Quiet, is expected to increase on day 1 (05 May), becoming Active to G1/Minor Storm with a chance of G2/Moderate to G3/Strong Storm conditions. Activity should generally subside through days 2-4 (06 to 08 May) to mostly Quiet conditions by the end of the period. Any glancing pass from 4 May CME could give a slight chance of reaching G1 levels late day 2/early day 3 (06 and 07 May).

Aurora Forecast: Combined coronal hole and CME effects are likely in the coming days increasing the chance of enhanced auroral activity. Aurora may be visible during the limited hours of darkness in parts of Scotland and Northern Ireland and perhaps visible across parts of northern England and North Wales where skies remain clear. Activity is most likely to be greatest Sunday into Monday, although timings of peak activity will be highly dependent on the arrival times of any enhancements.

Energetic Particles / Solar Radiation: Solar radiation levels is most likely to remain at background levels through the period. There is a slight chance for an S1/Minor Storm or greater event occurring throughout, primarily from the large, complex sunspot region in the northwest disc.

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Geomagnetic Storms:

Geo-Magnetic Storm Probability (Exceedance)	Level	Past 24 Hours (Yes/No)	Day 1 (00-24 UTC) (%)	Day 2 (00-24 UTC) (%)	Day 3 (00-24 UTC) (%)	Day 4 (00-24 UTC) (%)
Minor or Moderate	G1 to G2	No	80	60	20	5
Strong	G3	No	30	10	1	1
Severe	G4	No	10	5	1	1
Extreme	G5	No	1	1	1	1

Radio Blackouts - X Ray Flares:

X Ray Flares Probability	Level	Past 24 Hours (Yes/No)	Day 1 (00-24 UTC) (%)	Day 2 (00-24 UTC) (%)	Day 3 (00-24 UTC) (%)	Day 4 (00-24 UTC) (%)
Active	R1-R2 M Class	Yes	85	85	85	85
Very Active	R3 to R5 X	No	25	25	25	25

Solar Radiation Storms - (High Energy Protons):

Radiation Storms Probability (Exceedance)	Level (cm^{-2} sr^{-1} s^{-1})	Past 24 Hours (Yes/No)	Day 1 (00-24 UTC) (%)	Day 2 (00-24 UTC) (%)	Day 3 (00-24 UTC) (%)	Day 4 (00-24 UTC) (%)
Active	≥ S1	No	20	20	20	20
Very Active	≥ S3 *	No	1	1	1	1

* S3 ≥ 10 MeV ≥ 1000 pfu and / or ≥ 50 MeV ≥ 10 pfu. (pfu = $cm^{-2}sr^{-1}s^{-1}$)

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